PATENT ABSTRACTS OF JAPAN

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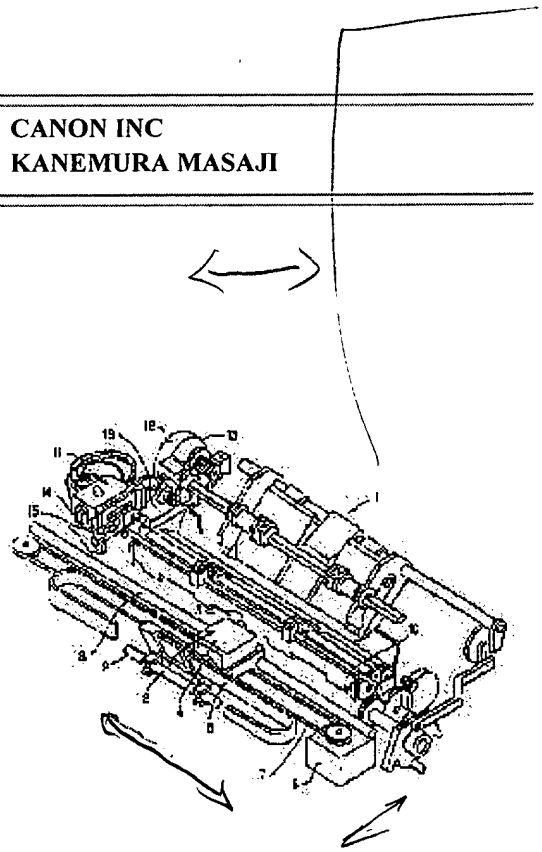
(54) INK JET RECORDING APPARATUS

(57)Abstract:
PURPOSE: To eliminate the contamination by an ink in the next printing by a constitution wherein a platen made of an ink absorption material is provided in a position opposing to a face of a recording head on which an ejection nozzle is formed in an ink jet recording apparatus.
CONSTITUTION: A platen 10 is disposed in a position opposing to a face of a recording head 2 on which a nozzle is formed and a recording medium is conveyed along the platen 10 in the direction crossing the movement direction of a carriage 5 by means of a supply paper conveyance mechanism. Data is recorded on the recording medium held by the platen 10 and at every time of finishing the recording of one line, the recording medium is conveyed by a prescribed pitch and the recording of the next line is carried out. These recording operations are repeated so that image is formed on a whole area of the recording medium. The platen 10 is made of, for example, a porous ceramic material that absorbs a printing ink so that in the case where the print on the edge portion of a paper is performed or the print is performed on a portion outside of the paper by mistaking the size thereof, the ink is absorbed by the absorber.



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CLAIMS

[Claim(s)]
[Claim 1] The ink-jet recording device characterized by a platen changing from the material of ink absorptivity to the delivery forming face of a recording head, and the position which counters in the ink-jet recording device which has a platen.

[Claim 2] A recording device according to claim 1 with a removable platen.
[Claim 3] The ink-jet recording device characterized by being equipped with the ink absorption member which one or more places of the printing ink impact side of a platen are concaves, and changes from the material of ink absorptivity to this concave portion in the ink-jet recording device which has a platen in the delivery forming face of a recording head, and the position which counters by adhesion.
[Claim 4] The ink-jet recording device which the notch of the one or more places of the printing ink impact side of a platen is carried out, and is characterized by being equipped with the ink absorption member which consists of the material of ink absorptivity from a background at this notch in the ink-jet recording device which has a platen in the delivery forming face of a recording head, and the position which counters.
[Claim 5] The ink-jet recording device which one or more places of the field where the printing ink of a platen reaches the delivery forming face of a recording head and the position which counters in the ink-jet recording device which has a platen are concaves, and an opening is between the side of either upper and lower sides of this concave section, and a platen, and is characterized by being equipped with the ink absorption member which consists of the material of ink absorptivity through this opening section from a platen background.
[Claim 6] the ink absorption with which it was equipped -- a member -- a recording device given in the claim 3 whose height is below height of a platen, or any 1 term of 5
[Claim 7] A recording device given in the claim 3 which can exchange an ink absorption member, or any 1 term of 5.
[Claim 8] The ink-jet recording device by which the notch of the one or more places of the field which the printing ink of a platen reaches is carried out, and the ink recovery slot is established in this notch back.
[Claim 9] The recording device according to claim 8 by which the ink recovery slot is connected with the waste ink tank of a print head.
[Claim 10] The recording device according to claim 8 by which the ink recovery slot is connected with the waste ink tank other than the waste ink tank of a print head.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] this invention relates to the printer which has a platen, especially an ink-jet recording device.
[0002]
[Description of the Prior Art] The recording device used as the compound electronic equipment containing the recording device which has functions, such as a printer, a copying machine, and facsimile, or a computer, a word processor, etc., or output equipment of a workstation is constituted so that the picture may be recorded on recorded materials, such as a form and plastics sheet metal, based on image information. Such a recording device can be divided into an ink-jet formula, a wire dot formula, a thermal formula, a laser-beam formula, etc. by the recording method.
[0003] In the conveyance direction (the direction of vertical scanning) of a recorded material After setting a recorded material to a predetermined record position, a picture is recorded by the record means carried on the carriage which moves along with a recorded material (horizontal scanning). Image recording of the whole recorded material is performed by performing the ejection (pitch conveyance) of the specified quantity, after ending record for one line, and repeating operation of recording the picture of the following line after that (horizontal scanning).
[0004] The recording device (ink-jet recording device) of an ink-jet formula It is what records on a recorded material by breathing out ink from a record means (recording head). Miniaturization of a record means is easy and can record a high definition picture at high speed. it is easy to be able to record without needing processing special to a regular paper, and for there to be little noise and to record a color picture moreover using multicolor ink, since a running cost is low and it is a non impact method -- etc. -- it has the advantage Much more improvement in the speed of record is possible for the line type equipment which uses a line type record means by which many deliveries were arranged in the direction of paper width especially.
[0005] By forming the electric thermal-conversion object produced on the substrate through semiconductor manufacture processes, such as etching, vacuum evaporationo, and sputtering, an electrode, a liquid route wall, a top plate, etc., the record means (recording head) of the ink-jet formula which carries out the regurgitation of the ink especially using heat energy can manufacture easily what has high-density liquid route arrangement (delivery arrangement), and can attain much more miniaturization. On the other hand, the demand to the quality of the material of a recorded material also has various things, and it has come to be required in recent years that thin paper, converted papers (punch for filing a hole with paper, paper with a perforation, paper of arbitrary configurations, etc.), etc. can be used else [, such as paper which is the usual recorded material, and resin sheet metal (OHP etc.),].
[0006]
[Problem(s) to be Solved by the Invention] In the aforementioned ink-jet recording device, in order to make paper flat, the platen is put on the scanning portion. The platen is usually made of material, such as a metal and plastics, and ink does not sink in. If it was in such a printer, when printing, and a setup of paper size was mistaken, or the paper of different size was inserted, paper was protruded, printing was made and printing ink might adhere on the platen, the ink of an ink jet was hygroscopic, ink did not dry but the platen section had the fault in which the reverse side of paper becomes dirty at the time of next printing, in order that ink did not sink in and might remain.
[0007] Then, a printer which the ink adhering to the platen section adheres to paper at the time of next printing, and does not soil it even if it prints in the platen section as mentioned above is desired.
[0008]
[Means for Solving the Problem] In the ink-jet recording device which this invention was made in view of the above-mentioned technical problem, and has a platen with the delivery forming face of a recording head in the position which counters (1) It is equipped [that a platen consists of the material of ink absorptivity,] with the ink absorption member which changes from the material of ink absorptivity to the printing ink impact side of (2) platens, Or a notch is given to the printing ink impact side of (3) platens, and the ink-jet recording device characterized by preparing the ink recovery means in the notch back is offered.
[0009]
[Function] Drawing 1 is the perspective diagram of the ink-jet recording device which applied this invention showing important section composition [like] 1 operative condition. In the ink-jet recording device 1 of drawing 1 , the record means (recording head) 2 of the cartridge type which unified the recording head portion 3 and the ink tank portion 4 is used, and the recording head 2 is carried in carriage 5. This carriage 5 is connected with a part of driving belt 7 which transmits the driving force of a drive motor 6, and guidance support of the both-way movement of it is enabled along with two guide shafts 8 and 9 each other arranged in parallel. The platen 10 is arranged in the delivery forming face of a recording head 2, and the position which counters, and a recorded material is conveyed in the direction at which it crosses in the move direction of the aforementioned carriage 5 along with a platen 10 according to a feed conveyance mechanism (ejection). thus, it records on the recorded material held at the aforementioned platen 10, and a part for a party is recorded -- ** -- alike -- a recorded material -- specified quantity pitch conveyance (ejection) -- carrying out -- again -- following -- one line is recorded, such record operation is repeated below, and the picture is formed throughout the recorded material

[0010] A recording head 2 is an ink-jet record means which carries out the regurgitation of the ink using heat energy, and is equipped with the electric thermal-conversion object for generating heat energy. Moreover, a recording head 2 records by making ink breathe out from a delivery using the pressure variation produced by growth of the film boiling and the foam which are produced with the heat energy impressed with the aforementioned electric thermal-conversion object, and contraction.
[0011] Drawing 2 is the partial perspective diagram showing typically the structure of the ink regurgitation section of a recording head 2. In drawing 2 , two or more deliveries 22 in a predetermined pitch are formed in the delivery forming face 21 which sets a recorded material and a predetermined crevice (for example, about about 0.5-2.0mm), and meets, and the electric thermal-conversion objects (exoergic resistor etc.) 25 for generating the energy for ink regurgitation along with the wall surface of each liquid route 24 which opens the common liquid room 23 and each delivery 22 for free passage are arranged in it. In this case, the recording head 2 is carried in carriage 5 by physical relationship to which a delivery 22 is located in a line in the move direction (main scanning direction) of carriage 5, and the crossing direction. In this way, the electric thermal-conversion object 25 which corresponds based on a picture signal or a regurgitation signal is driven (energization), film boiling of the ink in a liquid route 24 is carried out, and the recording head 2 which makes ink breathe out is constituted from a delivery 22 by the pressure then generated.
[0012] In the ink-jet recording device of drawing 1 , the recovery equipment 11 for canceling the poor regurgitation of a recording head 2 is arranged in the predetermined position (for example, home position) which is in the both-way moving range of a recording head 2, and separated from the record section. This recovery equipment 11 is driven in the contact / estrangement direction through a driving mechanism 13 to the delivery forming face 21 of a recording head 2 by the recovery motor 12. The cap 14 for carrying out capping (sealing) of the delivery forming face 21 is formed in the front face of this recovery equipment 11. It removes foreign matters, such as thickening ink in each delivery 22, fixing ink, dust, and a foam, and the recovery means 11 is constituted so that an ink regurgitation function may be normally recovered by it while it seals the delivery forming face 21 with a cap 14 in the case of recovery action. In addition, ink suction operation by the suction pump or ink feeding operation by the pressurization means within an ink supply path can perform compulsory eccrisis of the ink in this case.
[0013] The ink discharged at this time is discarded by the waste ink tank 18 through a pipe.
[0014] furthermore, wiping which changes from the blade of the shape of sheet metal formed by silicone rubber to the side by the side of the record section of recovery equipment 11 -- the member 15 is arranged In the example of illustration, a blade 15 is held with a cantilever form, by the aforementioned recovery motor 12 and the driving mechanism 13, it can move to a cross direction and the **** forming face 21 is contacted in an advance position. In this way, by advancing a blade 15, making it project in recording head moving trucking, and making the delivery forming face 21 **** with movement of a recording head 2 after the **** recovery action using recovery equipment 11, it is constituted so that the adhesion ink of the delivery forming face 21, ink dew condensation, dust, etc. may be wiped off and cleaned.
[0015] Although the case record by one recording head 2 above illustrated, the color ink-jet recording device equipped with two or more record meanses record by different color, the ink-jet recording device for gradation record using two or more recording heads which record in the ink in which color is the same and concentration differs, etc. can apply this invention similarly also regardless of the number of recording heads, and the same operation effect can attain. Moreover, although the case where the recording head of the exchangeable cartridge type which unified the recording head and an ink tank portion is used illustrated in the above-mentioned example, the thing of composition of this invention using a recording head portion and an ink tank portion as another parts, and connecting these by the ink supply tube etc. can apply similarly to the ink-jet recording device which uses the recording head of other various composition, and can attain the same effect.
[0016] Furthermore, although the ink-jet recording device of the serial type which carries the record means (recording head) 2 in carriage 5, and carries out horizontal scanning along with a recorded material was mentioned as the example and the above-mentioned example explained it, this invention can be applied similarly [in the case of the line type ink-jet recording device which uses the whole recording width of a recorded material, or a line type record means to correspond in part], and can attain the same effect.
[0017] In addition, if this invention is an ink-jet recording device, although it is applicable to what uses the record means (recording head) using electric machine conversion objects, such as a piezo-electric element, etc., for example, it brings about the effect which was excellent in the ink-jet recording device of ****** which breathes out ink using heat energy especially. It is because the densification of record and highly minute-ization can be attained according to this method.
[0018] About the typical composition and typical principle, what is performed using the fundamental principle currently indicated by the U.S. Pat. No. 4723129 specification and the 4740796 specification, for example is desirable. Although this method is applicable to both the so-called on-demand type and the Conti nuance type On the electric thermal-conversion object which is especially arranged corresponding to the sheet and liquid route where the liquid (ink) is held in the on-demand type case By impressing at least one driving signal which gives the rapid temperature rise which corresponds to recording information and exceeds a nucleate-boiling phenomenon Since make an electric thermal-conversion object generate heat energy, the heat operating surface of a record means (recording head) is made to produce film boiling and the air bubbles in the liquid (ink) corresponding to this driving signal can be formed by the one to one as a result, it is effective.
[0019] A liquid (ink) is made to breathe out through ****** opening by growth of these air bubbles, and contraction, and at least one drop is formed. If this driving signal is made into the shape of a pulse form, since growth contraction of air bubbles will be performed appropriately instancy, **** of a liquid (ink) excellent in especially responsibility can be attained, and it is more desirable. As a driving signal of the shape of this pulse form, what is indicated by the U.S. Pat. No. 4463359 specification and this No. 4345262 specification is ****(ed). In addition, if the conditions indicated by the U.S. Pat. No. 4313124 specification of invention about the rate of a temperature rise of the above-mentioned heat operating surface are adopted, further excellent record can be performed.
[0020] The composition using the U.S. Pat. No. 4558333 specification and U.S. Pat. No. 4459600 specification which indicate the composition arranged to the field to which the heat operation section other than the combination composition (a straight-line-like liquid flow channel or right-angled liquid flow channel) of a delivery which is indicated by each above-mentioned specification as composition of a recording head, a liquid route, and an electric thermal-conversion object

is crooked is also included in this invention. In addition, this invention is effective also as composition based on JP,59-138461,A which indicates the composition whose puncturing which absorbs the pressure wave of JP,59-123670,A which indicates the composition which makes a common slit ****** of an electric thermal-conversion object to two or more electric thermal-conversion objects, or heat energy is made to correspond to ******. That is, it is because it can record efficiently certainly according to this invention no matter the form of a recording head may be what thing.
[0021] Furthermore, this invention is effectively applicable also to the recording head of the full line type which has the length corresponding to the maximum width of the record medium which can record a recording device. As such a recording head, any of the composition which fills the length with the combination of two or more recording heads, and the composition as one recording head formed in one are sufficient.
[0022] In addition, this invention is effective when the thing of a serial type like an upper example also uses the recording head fixed to the main part of equipment, the recording head exchangeable chip type to which the electric connection with the main part of equipment and supply of the ink from the main part of equipment are attained by the main part of equipment being equipped, or the recording head of the cartridge type with which the ink tank was formed in the recording head itself in one.
[0023] Moreover, it is a book to add the recovery means against a recording head prepared in this invention as composition of a recording device, preliminary auxiliary means, etc. It is effective in order to perform record stabilized by performing the capping means against a recording head, a cleaning means, pressurization or a suction means, an electric thermal-conversion object, a heating element different from this or the preheating means by such combination, and reserve **** mode in which **** different from record is performed, if these are mentioned concretely.
[0024] moreover, two or more ink which differs in an others and record color or concentration although only one piece was prepared also about the kind or the number of a recording head carried, for example corresponding to monochromatic ink -- corresponding -- two or more pieces -- more than -- it may be prepared That is, although not only the recording mode of only which black mainstream color as a recording mode of a recording device but a recording head may be constituted in one or the paddle gap by two or more combination is sufficient, for example, this invention is very effective also in equipment equipped with full color at least one by the different double color color or different color mixture of a color.
[0025] Furthermore, in addition, it is ink solidified less than [a room temperature or it] although the example explained above explains ink as a liquid, and by the thing softened or liquefied at a room temperature, or the ink-jet method, since what carries out a temperature control is common as a temperature control is performed for ink itself within the limits of 30 degrees C or more 70 degrees C or less and it is in the stable **** range about the viscosity of ink, ink should just make the shape of liquid at the time of use record signal grant. In addition, it carries out whether the ink which prevents by making the temperature up by heat energy use it positively as energy of the change of state from a solid state to the liquid state of ink, or is solidified in the state of neglect for the purpose of antiflashing of ink is used. Anyway, ink liquefies by grant according to the record signal of heat energy. When using the ink of the property liquefied for the first time with heat energy, such as that by which liquefied ink is breathed out, and a thing which it already begins to solidify when reaching a record medium, it can apply to this invention.
[0026] The ink in this case is good for a porosity sheet crevice or a breakthrough which is indicated by JP,54-56847,A or JP,60-71260,A also as liquefied or a form which counters to an electric thermal-conversion object in the state where it was held as a solid. In this invention, the most effective thing performs the film-boiling method mentioned above to each ink mentioned above.
[0027] Furthermore, in addition, as a form of the ink-jet recording device by this invention, although used as the picture outgoing end end of information management systems, such as a computer, you may take the form of the reproducing unit combined with others, the reader, etc., and the facsimile apparatus which has a transceiver function further.
[0028]
[Example]
(Example 1) The perspective diagram and typical cross section of an ink-jet recording device of a platen portion are shown in drawing 3 . [of this invention] [of one embodiment] The platen 10 is made from the quality of the material which absorbs printing ink, such as for example, a porosity ceramic, it makes a mistake in the case where it prints to the edge of paper, or paper size, and even if it separates from it and prints a form, ink has structure absorbed by the absorber. The absorbed ink does not soil the form, even if it is spread in a platen, it dries and a form passes through a it top. Moreover, the platen 10 is removable and has structure inserted in the slide 30 for wearing in this example. A platen 10 will be exchanged if the amount of accumulation absorption of ink increases while continuing printing.
[0029] (Example 2) The perspective diagram and typical cross section of an ink-jet recording device of a platen portion are shown in drawing 4 . [of this invention] [of another embodiment] With this equipment, the base material and ink absorber of a platen serve as another member. That is, the ink absorber 31 is stuck on the crevice formed in the platen 10, when the dirt in ink becomes remarkable, removes it and sticks a new absorber. In this case, there is an advantage which can make cost low as compared with the case of the example 1 which exchanges the platen 10 whole.
[0030] (Example 3) The perspective diagram and typical cross section of an ink-jet recording device of a platen portion are shown in drawing 5 . [of this invention] [of another embodiment] An ink absorber is attached only in the required portion of a platen with this equipment. Namely, what is necessary is to attach an ink absorber only in ends in the core through which paper surely passes, since ink does not adhere to a platen 10, if the situation which makes a mistake in the case where it prints to the edge of paper as mentioned above, or paper size, and is printed besides paper is assumed.
[0031] In this case, an absorber can be made small, removal and wearing become easy, and there is an advantage to which cost is also lowered. Moreover, since a flat portion is in a center section, there is no connection of a form in the case of feeding, and it is effective in paper being sent smoothly.
[0032] (Example 4) The perspective diagram and typical cross section of an ink-jet recording device of a platen portion are shown in drawing 6 . [of this invention] [of another embodiment] With this equipment, a notch is put into a platen 10 and it has the structure of sticking the ink absorber 31 from the background. In this case, there is an advantage which can enlarge an absorber as compared with the method which sticks an ink absorber on a platen crevice.
[0033] (Example 5) The perspective diagram and typical cross section of an ink-jet recording device of a platen portion are

shown in drawing 7 . [of this invention] [of another embodiment] With this equipment, except for a center section, a notch is given to a platen by the same reason as an example 3, and the ink absorber 31 is stuck on the notch from the background like the example 4.
[0034] (Example 6) The perspective diagram and typical cross section of an ink-jet recording device of a platen portion are shown in drawing 8 . [of this invention] [of another embodiment] With this equipment, the printing side of a platen 10 is made into a concave, and the side on the concave portion has structure separated from the platen. In this case, the ink absorber 31 is attached so that the surface of a crevice may be put.
[0035] Thus, about the thing equipped with an ink absorber of a type, the both sides can be used by turning an absorber over.

[0036] (Example 7) The perspective diagram and typical cross section of an ink-jet recording device of a platen portion are shown in drawing 9 . [of this invention] [of another embodiment] With this equipment, the notch is given to the platen except for the center section for the same reason as an example 3, and other structures are the same as an example 6.
[0037] (Example 8) The perspective diagram and typical cross section of an ink-jet recording device of a platen portion are shown in drawing 10 . [of this invention] [of another embodiment] With this equipment, a notch is given to a platen 10 and the slot 32 which collects ink is established in the back. furthermore, the waste ink tank 18 for print heads in the ink collected in this slot -- or it is introduced into a waste ink tank separate from it By this method, there is an advantage that there is no need for exchange of an absorber.
[0038] (Example 9) The perspective diagram and typical cross section of an ink-jet recording device of a platen portion are shown in drawing 11 . [of this invention] [of another embodiment] With this equipment, the notch is given to the platen except for the center section for the same reason as an example 3, and other structures are the same as an example 8.
[0039]
[Effect of the Invention] As explained above, even if it protrudes a form at the time of printing and prints directly to a platen side by this invention, the ink is absorbed or collected, and the ink-jet recording device in which a form does not become dirty in the ink adhering to the platen side is offered. By such recording device, printing used to the edge of a form is attained and the flexibility of document preparation spreads. Furthermore, since an ink absorber is exchangeable if the amount of ink absorption increases, a maintenance is also easy.

[Translation done.]

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TECHNICAL FIELD

[Industrial Application] this invention relates to the printer which has a platen, especially an ink-jet recording device.

[Translation done.]

PRIOR ART

[Description of the Prior Art] The recording device used as the compound electronic equipment containing the recording device which has functions, such as a printer, a copying machine, and facsimile, or a computer, a word processor, etc., or output equipment of a workstation is constituted so that the picture may be recorded on recorded materials, such as a form and plastics sheet metal, based on image information. Such a recording device can be divided into an ink-jet formula, a wire dot formula, a thermal formula, a laser-beam formula, etc. by the recording method.

[0003] In the conveyance direction (the direction of vertical scanning) of a recorded material Image recording of the whole recorded material is performed by performing the ejection (pitch conveyance) of the specified quantity, after recording a picture (horizontal scanning) and ending record for one line by the record means carried on the carriage which moves along with a recorded material after setting a recorded material to a predetermined record position, and repeating operation of recording the picture of the following line after that (horizontal scanning).

[0004] The recording device (ink-jet recording device) of an ink-jet formula records on a recorded material by breathing out ink from a record means (recording head). miniaturization of a record means is easy and it is easy to be able to record a high definition picture at high speed, to be able to record, without needing processing special to a regular paper, and for there to be little noise and to record a color picture moreover using multicolor ink, since a running cost is low and it is a non impact method -- etc. -- it has the advantage Much more improvement in the speed of record is possible for the line type equipment which uses a line type record means by which many deliveries were arranged in the direction of paper width especially.

[0005] By forming the electric thermal-conversion object produced on the substrate through semiconductor manufacture processes, such as etching, vacuum evaporationo, and sputtering, an electrode, a liquid route wall, a top plate, etc., the record means (recording head) of the ** ink-jet formula which breathes out ink especially using heat energy can manufacture easily what has high-density liquid route arrangement (delivery arrangement), and can attain much more miniaturization. On the other hand, the demand to the quality of the material of a recorded material also has various things, and it has come to be required in recent years that thin paper, converted papers (punch for filing a hole with paper, paper with a perforation, paper of arbitrary configurations, etc.), etc. can be used else [, such as paper which is the usual recorded material, and resin sheet metal (OHP etc.),].

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EFFECT OF THE·INVENTION

[Effect of the Invention] As explained above, even if it protrudes a form at the time of printing and prints directly to a platen side by this invention, the ink is absorbed or collected, and the ink-jet recording device in which a form does not become dirty in the ink adhering to the platen side is offered. By such recording device, printing used to the edge of a form is attained and the flexibility of document preparation spreads. Furthermore, since an ink absorber is exchangeable if the amount of ink absorption increases, a maintenance is also easy.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] In the aforementioned ink-jet recording device, in order to make paper flat, the platen is put on the scanning portion. The platen is usually made of material, such as a metal and plastics, and ink does not sink in. If it was in such a printer, when printing, and a setup of paper size was mistaken, or the paper of different size was inserted, paper was protruded, printing was made and printing ink might adhere on the platen, the ink of an ink jet was hygroscopic, ink did not dry but the platen section had the fault in which the reverse side of paper becomes dirty at the time of next printing, in order that ink did not sink in and might remain.
[0007] Then, a printer which the ink adhering to the platen section adheres to paper at the time of next printing, and does not soil it even if it prints in the platen section as mentioned above is desired.

[Translation done.]

MEANS

[Means for Solving the Problem] In the ink-jet recording device which this invention was made in view of the above-mentioned technical problem, and has a platen with the delivery forming face of a recording head in the position which counters (1) It is equipped [that a platen consists of the material of ink absorptivity,] with the ink absorption member which changes from the material of ink absorptivity to the printing ink impact side of (2) platens, Or a notch is given to the printing ink impact side of (3) platens, and the ink-jet recording device characterized by preparing the ink recovery means in the notch back is offered.

[Translation done.]

OPERATION

[Function] Drawing 1 is the perspective diagram of the ink-jet recording device which applied this invention showing important section composition [like] 1 operative condition. In the ink-jet recording device 1 of drawing 1 , the record means (recording head) 2 of the cartridge type which unified the recording head portion 3 and the ink tank portion 4 is used, and the recording head 2 is carried in carriage 5. This carriage 5 is connected with a part of driving belt 7 which transmits the driving force of a drive motor 6, and guidance support of the both-way movement of it is enabled along with two guide shafts 8 and 9 each other arranged in parallel. The platen 10 is arranged in the delivery forming face of a recording head 2, and the position which counters, and a recorded material is conveyed in the direction at which it crosses in the move direction of the aforementioned carriage 5 along with a platen 10 according to a feed conveyance mechanism (ejection). thus, it records on the recorded material held at the aforementioned platen 10, and a part for a party is recorded -- ** -- alike -- a recorded material -- specified quantity pitch conveyance (ejection) -- carrying out -- again -- following -- one line is recorded, such record operation is repeated below, and the picture is formed throughout the recorded material

[0010] A recording head 2 is an ink-jet record means which carries out the regurgitation of the ink using heat energy, and is equipped with the electric thermal-conversion object for generating heat energy. Moreover, a recording head 2 records by making ink breathe out from a delivery using the pressure variation produced by growth of the film boiling and the foam which are produced with the heat energy impressed with the aforementioned electric thermal-conversion object, and contraction.

[0011] Drawing 2 is the partial perspective diagram showing typically the structure of the ink regurgitation section of a recording head 2. In drawing 2 , two or more deliveries 22 in a predetermined pitch are formed in the delivery forming face 21 which sets a recorded material and a predetermined crevice (for example, about about 0.5-2.0mm), and meets, and the electric thermal-conversion objects (exoergic resistor etc.) 25 for generating the energy for ink regurgitation along with the wall surface of each liquid route 24 which opens the common liquid room 23 and each delivery 22 for free passage are arranged in it. In this case, the recording head 2 is carried in carriage 5 by physical relationship to which a delivery 22 is located in a line in the move direction (main scanning direction) of carriage 5, and the crossing direction. In this way, the electric thermal-conversion object 25 which corresponds based on a picture signal or a regurgitation signal is driven (energization), film boiling of the ink in a liquid route 24 is carried out, and the recording head 2 which makes ink breathe out is constituted from a delivery 22 by the pressure then generated.

[0012] In the ink-jet recording device of drawing 1 , the recovery equipment 11 for canceling the poor regurgitation of a recording head 2 is arranged in the predetermined position (for example, home position) which is in the both-way moving range of a recording head 2, and separated from the record section. This recovery equipment 11 is driven in the contact / estrangement direction through a driving mechanism 13 to the delivery forming face 21 of a recording head 2 by the recovery motor 12. The cap 14 for carrying out capping (sealing) of the delivery forming face 21 is formed in the front face of this recovery equipment 11. It removes foreign matters, such as thickening ink in each delivery 22, fixing ink, dust, and a foam, and the recovery means 11 is constituted so that an ink regurgitation function may be normally recovered by it while it seals the delivery forming face 21 with a cap 14 in the case of recovery action. In addition, ink suction operation by the suction pump or ink feeding operation by the pressurization means within an ink supply path can perform compulsory eccrisis of the ink in this case.

[0013] The ink discharged at this time is discarded by the waste ink tank 18 through a pipe.

[0014] furthermore, wiping which changes from the blade of the shape of sheet metal formed by silicone rubber to the side by the side of the record section of recovery equipment 11 -- the member 15 is arranged In the example of illustration, a blade 15 is held with a cantilever gestalt, by the aforementioned recovery motor 12 and the driving mechanism 13, it can move to a cross direction and the regurgitation forming face 21 is contacted in an advance position. In this way, by advancing a blade 15, making it project in recording head moving trucking, and making the delivery forming face 21 **** with movement of a recording head 2 after the regurgitation recovery action using recovery equipment 11, it is constituted so that the adhesion ink of the delivery forming face 21, ink dew condensation, dust, etc. may be wiped off and cleaned.

[0015] Although the case record by one recording head 2 above illustrated, the color ink-jet recording device equipped with two or more record meanses record by different color, the ink-jet recording device for gradation record using two or more recording heads which record in the ink in which color is the same and concentration differs, etc. can apply this invention similarly also regardless of the number of recording heads, and the same operation effect can attain. Moreover, although the case where the recording head of the exchangeable cartridge type which unified a recording head and an ink tank portion is used illustrated in the above-mentioned example, the thing of composition of this invention using a recording head portion and an ink tank portion as another parts, and connecting these by the ink supply tube etc. can apply similarly to the ink-jet recording device which uses the recording head of other various composition, and can attain the same effect.

[0016] Furthermore, although the ink-jet recording device of the serial type which carries the record means (recording head) 2 in carriage 5, and carries out horizontal scanning along with a recorded material was mentioned as the example and the above-mentioned example explained it, this invention can be applied similarly [in the case of the line type ink-jet recording device which uses the whole recording width of a recorded material, or a line type record means to correspond in part], and can attain the same effect.

[0017] In addition, if this invention is an ink-jet recording device, although it is applicable to what uses the record means (recording head) using electric machine conversion objects, such as a piezo-electric element, etc., for example, it brings about the effect which was excellent in the ink-jet recording device of the method which carries out the regurgitation of the ink using heat energy especially. It is because the densification of record and highly minute-ization can be attained according to this method.
[0018] About the typical composition and typical principle, what is performed using the fundamental principle currently indicated by the U.S. Pat. No. 4723129 specification and the 4740796 specification, for example is desirable. Although this method is applicable to both the so-called on-demand type and the Conti nuance type On the electric thermal-conversion object which is especially arranged corresponding to the sheet and liquid route where the liquid (ink) is held in the on-demand type case By impressing at least one driving signal which gives the rapid temperature rise which corresponds to recording information and exceeds a nucleate-boiling phenomenon Since make an electric thermal-conversion object generate heat energy, the heat operating surface of a record means (recording head) is made to produce film boiling and the foam in the liquid (ink) corresponding to this driving signal can be formed by the one to one as a result, it is effective.
[0019] A liquid (ink) is made to breathe out through opening for regurgitation by growth of this foam, and contraction, and at least one drop is formed. If this driving signal is made into the shape of a pulse form, since growth contraction of a foam will be performed appropriately instancy, the regurgitation of a liquid (ink) excellent in especially responsibility can be attained, and it is more desirable. As a driving signal of the shape of this pulse form, what is indicated by the U.S. Pat. No. 4463359 specification and this No. 4345262 specification is ****(ed). In addition, if the conditions indicated by the U.S. Pat. No. 4313124 specification of invention about the rate of a temperature rise of the above-mentioned heat operating surface are adopted, further excellent record can be performed.
[0020] The composition using the U.S. Pat. No. 4558333 specification and U.S. Pat. No. 4459600 specification which indicate the composition arranged to the field to which the heat operation section other than the combination composition (a straight-line-like liquid flow channel or right-angled liquid flow channel) of a delivery which is indicated by each above-mentioned specification as composition of a recording head, a liquid route, and an electric thermal-conversion object is crooked is also included in this invention. In addition, this invention is effective also as composition based on JP,59-138461,A which indicates the composition whose puncturing which absorbs the pressure wave of JP,59-123670,A which indicates the composition which makes a common slit the regurgitation section of an electric thermal-conversion object to two or more electric thermal-conversion objects, or heat energy is made to correspond to the regurgitation section. That is, it is because it can record efficiently certainly according to this invention no matter the gestalt of a recording head may be what thing.
[0021] Furthermore, this invention is effectively applicable also to the recording head of the full line type which has the length corresponding to the maximum width of the record medium which can record a recording device. As such a recording head, any of the composition which fills the length with the combination of two or more recording heads, and the composition as one recording head formed in one are sufficient.
[0022] In addition, this invention is effective when the thing of a serial type like an upper example also uses the recording head fixed to the main part of equipment, the recording head exchangeable chip type to which the electric connection with the main part of equipment and supply of the ink from the main part of equipment are attained by the main part of equipment being equipped, or the recording head of the cartridge type with which the ink tank was formed in the recording head itself in one.
[0023] Moreover, it is a book to add the recovery means against a recording head prepared in this invention as composition of a recording device, preliminary auxiliary means, etc. It is effective in order to perform record stabilized by performing reserve regurgitation mode in which the capping means against a recording head, a cleaning means, pressurization or a suction means, an electric thermal-conversion object, a heating element different from this or the preheating means by such combination, and the regurgitation different from record are performed, if these are mentioned concretely.
[0024] moreover, two or more ink which differs in an others and record color or concentration although only one piece was prepared also about the kind or the number of a recording head carried, for example corresponding to monochromatic ink -- corresponding -- two or more pieces -- more than -- it may be prepared That is, although not only the recording mode of only which black mainstream color as a recording mode of a recording device but a recording head may be constituted in one or the paddle gap by two or more combination is sufficient, for example, this invention is very effective also in equipment equipped with full color at least one by the different double color color or different color mixture of a color.
[0025] Furthermore, in addition, it is ink solidified less than [a room temperature or it] although the example explained above explains ink as a liquid, and by the thing softened or liquefied at a room temperature, or the ink-jet method, since what carries out a temperature control is common as a temperature control is performed for ink itself within the limits of 30 degrees C or more 70 degrees C or less and it is in the stable regurgitation range about the viscosity of ink, ink should just make the shape of liquid at the time of use record signal grant. In addition, it carries out whether the ink which prevents by making the temperature up by heat energy use it positively as energy of the change of state from a solid state to the liquid state of ink, or is solidified in the state of neglect for the purpose of antiflashing of ink is used. Anyway, ink liquefies by grant according to the record signal of heat energy. When using the ink of the property liquefied for the first time with heat energy, such as that by which liquefied ink is breathed out, and a thing which it already begins to solidify when reaching a record medium, it can apply to this invention.
[0026] The ink in this case is good for a porosity sheet crevice or a breakthrough which is indicated by JP,54-56847,A or JP,60-71260,A also as liquefied or a gestalt which counters to an electric thermal-conversion object in the state where it was held as a solid. In this invention, the most effective thing performs the film-boiling method mentioned above to each ink mentioned above.
[0027] Furthermore, in addition, as a gestalt of the ink-jet recording device by this invention, although used as the picture outgoing end end of information management systems, such as a computer, you may take the gestalt of the reproducing unit combined with others, the reader, etc., and the facsimile apparatus which has a transceiver function further.

[Translation done.]

EXAMPLE

[Example]
(Example 1) The perspective diagram and typical cross section of an ink-jet recording device of a platen portion are shown in drawing 3 . [of this invention] [of one embodiment] The platen 10 is made from the quality of the material which absorbs printing ink, such as for example, a porosity ceramic, it makes a mistake in the case where it prints to the edge of paper, or paper size, and even if it separates from it and prints a form, ink has structure absorbed by the absorber. The absorbed ink does not soil the form, even if it is spread in a platen, it dries and a form passes through a it top. Moreover, the platen 10 is removable and has structure inserted in the slide 30 for wearing in this example. A platen 10 will be exchanged if the accumulation absorbed dose of ink increases while continuing printing.
[0029] (Example 2) The perspective diagram and typical cross section of an ink-jet recording device of a platen portion are shown in drawing 4 . [of this invention] [of another embodiment] With this equipment, the base material and ink absorber of a platen serve as another member. That is, the ink absorber 31 is stuck on the crevice formed in the platen 10, when the dirt in ink becomes remarkable, removes it and sticks a new absorber. In this case, there is an advantage which can make cost low as compared with the case of the example 1 which exchanges the platen 10 whole.
[0030] (Example 3) The perspective diagram and typical cross section of an ink-jet recording device of a platen portion are shown in drawing 5 . [of this invention] [of another embodiment] An ink absorber is attached only in the required portion of a platen with this equipment. Namely, what is necessary is to attach an ink absorber only in ends in the core through which paper surely passes, since ink does not adhere to a platen 10, if the situation which makes a mistake in the case where it prints to the edge of paper as mentioned above, or paper size, and is printed besides paper is assumed.
[0031] In this case, an absorber can be made small, removal and wearing become easy, and there is an advantage to which cost is also lowered. Moreover, since a flat portion is in a center section, there is no connection of a form in the case of feeding, and it is effective in paper being sent smoothly.
[0032] (Example 4) The perspective diagram and typical cross section of an ink-jet recording device of a platen portion are shown in drawing 6 . [of this invention] [of another embodiment] With this equipment, a notch is put into a platen 10 and it has the structure of sticking the ink absorber 31 from the background. In this case, there is an advantage which can enlarge an absorber as compared with the method which sticks an ink absorber on a platen crevice.
[0033] (Example 5) The perspective diagram and typical cross section of an ink-jet recording device of a platen portion are shown in drawing 7 . [of this invention] [of another embodiment] With this equipment, except for a center section, a notch is given to a platen by the same reason as an example 3, and the ink absorber 31 is stuck on the notch from the background like the example 4.
[0034] (Example 6) The perspective diagram and typical cross section of an ink-jet recording device of a platen portion are shown in drawing 8 . [of this invention] [of another embodiment] With this equipment, the printing side of a platen 10 is made into a concave, and the side on the concave portion has structure separated from the platen. In this case, the ink absorber 31 is attached so that the surface of a crevice may be put.
[0035] Thus, about the thing equipped with an ink absorber of a type, the both sides can be used by turning an absorber over.

[0036] (Example 7) The perspective diagram and typical cross section of an ink-jet recording device of a platen portion are shown in drawing 9 . [of this invention] [of another embodiment] With this equipment, the notch is given to the platen except for the center section for the same reason as an example 3, and other structures are the same as an example 6.
[0037] (Example 8) The perspective diagram and typical cross section of an ink-jet recording device of a platen portion are shown in drawing 10 . [of this invention] [of another embodiment] With this equipment, a notch is given to a platen 10 and the slot 32 which collects ink is established in the back. furthermore, the waste ink tank 18 for print heads in the ink collected in this slot -- or it is introduced into a waste ink tank separate from it By this method, there is an advantage that there is no need for exchange of an absorber.
[0038] (Example 9) The perspective diagram and typical cross section of an ink-jet recording device of a platen portion are shown in drawing 11 . [of this invention] [of another embodiment] With this equipment, the notch is given to the platen except for the center section for the same reason as an example 3, and other structures are the same as an example 8.

[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the perspective diagram of the ink-jet recording device of this invention showing important section composition [like] 1 operative condition.
[Drawing 2] It is the partial perspective diagram showing typically the structure of the ink regurgitation section of the record means (recording head) of the equipment of drawing 1 .
[Drawing 3] It is drawing of the ink-jet recording device of this invention showing a platen portion [like] 1 operative condition, and a is the perspective diagram and b is a typical cross section.
[Drawing 4] It is drawing showing the platen portion of another embodiment of the ink-jet recording device of this invention, and a is the perspective diagram and b is a typical cross section.
[Drawing 5] It is drawing showing the platen portion of still more nearly another embodiment of the ink-jet recording device of this invention, and a is the perspective diagram and b is a typical cross section.
[Drawing 6] It is drawing showing the platen portion of still more nearly another embodiment of the ink-jet recording device of this invention, and a is the perspective diagram and b is a typical cross section.
[Drawing 7] It is drawing showing the platen portion of still more nearly another embodiment of the ink-jet recording device of this invention, and a is the perspective diagram and b is a typical cross section.
[Drawing 8] It is drawing showing the platen portion of still more nearly another embodiment of the ink-jet recording device of this invention, and a is the perspective diagram and b is a typical cross section.
[Drawing 9] It is drawing showing the platen portion of still more nearly another embodiment of the ink-jet recording device of this invention, and a is the perspective diagram and b is a typical cross section.
[Drawing 10] It is drawing showing the platen portion of still more nearly another embodiment of the ink-jet recording device of this invention, and a is the perspective diagram and b is a typical cross section.
[Drawing 11] It is drawing showing the platen portion of still more nearly another embodiment of the ink-jet recording device of this invention, and a is the perspective diagram and b is a typical cross section.
[Description of Notations]
1 Ink-Jet Recording Device
2 Record Means (Recording Head)
3 Recording Head Portion
4 Ink Tank Portion
5 Carriage
6 Drive Motor
7 Driving Belt
8 Nine Guide shaft
10 Platen
11 Recovery Equipment
12 Recovery Motor
13 Driving Mechanism
14 Cap
15 Wiping Member (Blade)
18 Waste Ink Tank
21 Delivery Forming Face
22 Delivery
23 Common Liquid Room
24 Liquid Route
25 Electric Thermal-Conversion Object
30 Slide for Wearing
31 Ink Absorber
32 Ink Recovery Slot

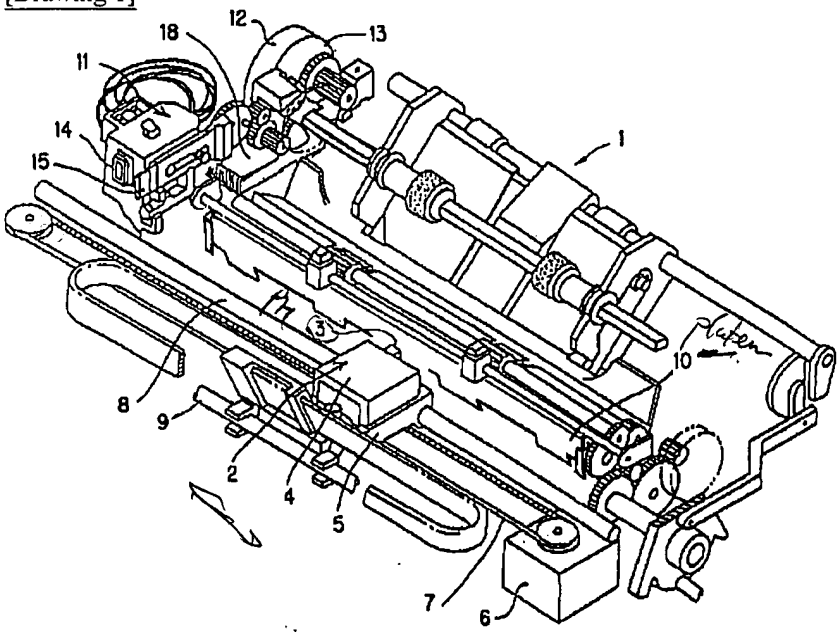
[Translation done.]

* NOTICES *

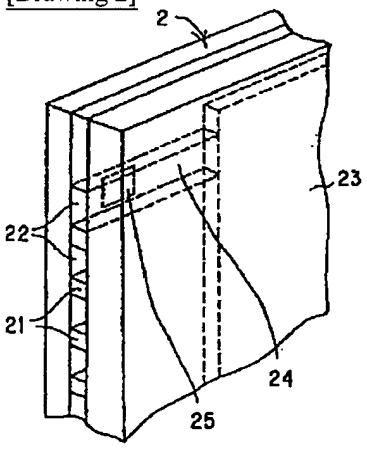
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

[Drawing 1]

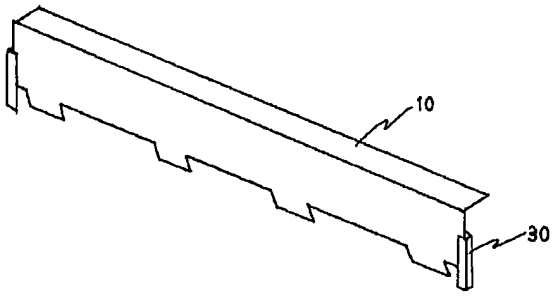


[Drawing 2]



[Drawing 3]

(a)



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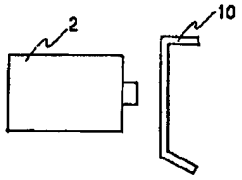
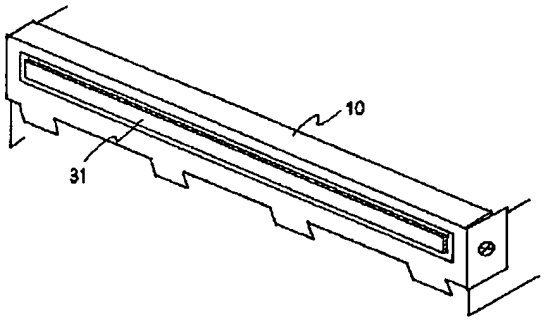


[Drawing 4]

(a)



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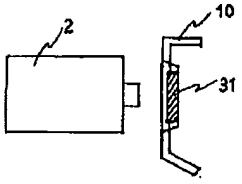

[Drawing 5]

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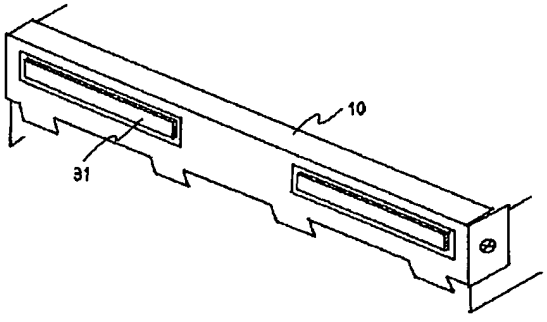

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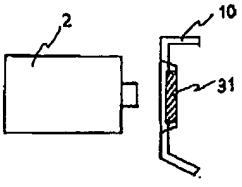
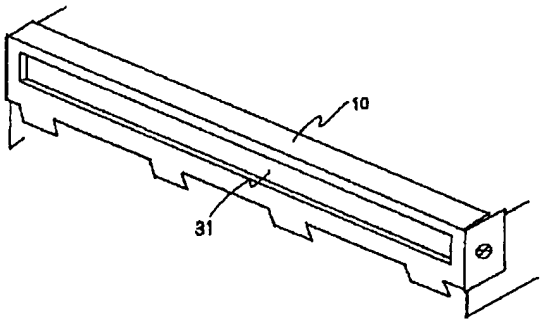


[Drawing 6]

(a)



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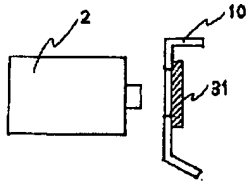

[Drawing 7]

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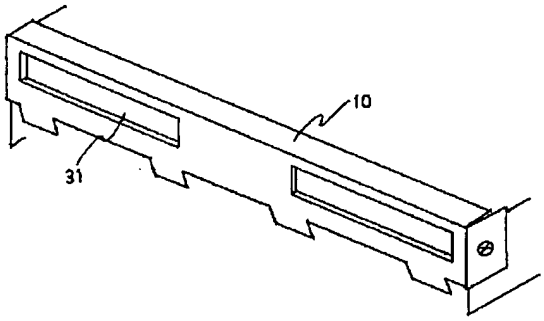

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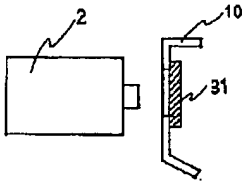
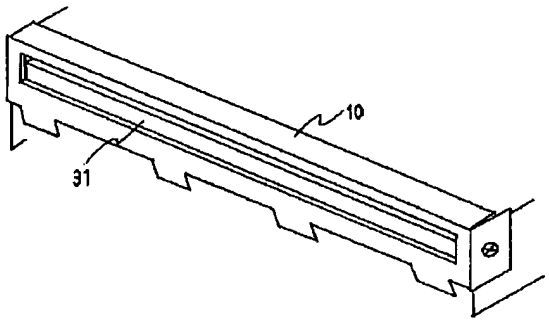


[Drawing 8]

(a)



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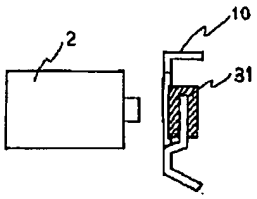

[Drawing 9]

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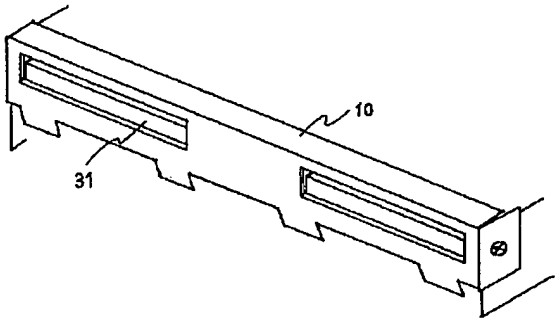

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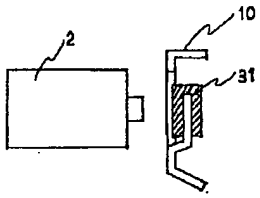
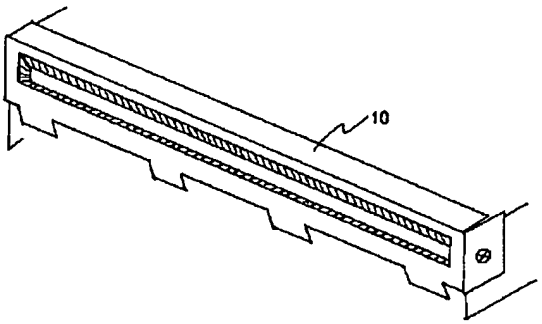


[Drawing 10]

(a)



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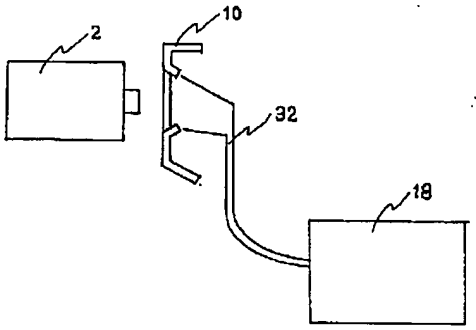

[Drawing 11]

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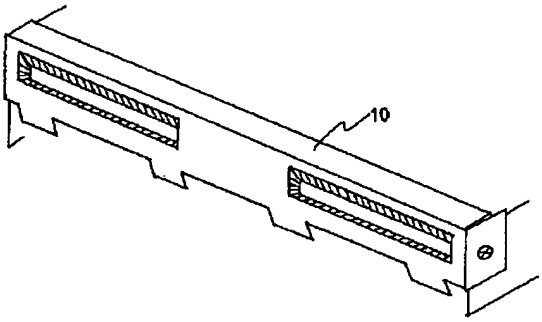

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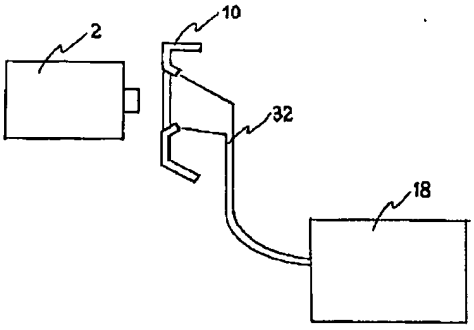

[Translation done.]